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Renewable Energy: A Bright Future

Save money and the environment by integrating a solar, fuel cell or wind energy system.

by:

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Renewable power sources and energy efficiency could meet 60 percent of the nation's need for new electric power plants over the next 20 years, according to a November 2000 study by the U.S. Department of Energy. Although high cost and slow paybacks have long been barriers to incorporating a solar energy system, the good news is that the combined efforts of industry and the Department of Energy have reduced solar photovoltaic (PV) system costs by more than 300 percent since 1982.

To make it even more attractive, many state rebate programs provide financial incentives to help offset the higher-cost hurdle, making solar, wind and fuel cell systems an affordable investment. Many states also provide net metering agreements and tax credits for the purchase and installation of a renewable energy system, and some of the largest companies in America have already taken advantage of our natural resources and are saving money and the environment.

Under net metering, the utility meter spins backwards when the system is producing more electricity than the facility is using. The utility effectively serves as a storage system for excess electricity and as power is generated, it is either immediately used or transmitted to the utility company and customers receive a credit for the excess power their systems produce. Currently, 33 states allow net metering for various types of renewable technologies including small wind, solar energy systems, hydropower and fuel cells.

Solar Photovoltaics (PV)

In December 2000, Arden Realty, the largest commercial real estate landlord in Southern California, unveiled a 250 kilowatt (kW) solar PV system at City Centre, a three-story office complex in Fountain Valley. Combined with a range of efficiency measures, the system, which generates approximately 10 percent of the facility's energy needs, is proving to be a smart investment. "From an owner's standpoint, energy efficiency and solar power reduce costs over time," says Scott Lyle, president of Next Edge, an energy services subsidiary of Arden. "Lower operational costs equate to increased asset value." Arden received a $620,000 rebate through the California Energy Commission's Buydown Program. Through this program and the California Public Utilities' Self-Generation Program, businesses and residents are eligible to receive rebates of $4.50 per watt, or up to 50 percent of the installed cost of a solar photovoltaic, wind or fuel cell system.

Lyle first recommends looking at energy efficiency before going solar. Four years ago Arden set out to make the 18.5 million square feet of space more energy efficient. An investment of $25 million in efficiency measures removed nine megawatts of demand across the building portfolio, with a payback of under five years. Lyle reminds businesses that it doesn't make sense to layer on renewable technologies until all systems are optimized for maximum efficiency.

Large, flat commercial rooftops are ideal for solar panels. "Solar panels have no moving parts and therefore, few maintenance problems," explains Duane Lappinga, vice president of operations and senior engineer at Next Edge." The panels also make the roof last longer."

Senaka Nanayakkara, director of facilities at Neutrogena in Los Angeles, advises facility managers to talk with their local utility about financial incentives available for renewable energy systems. Neutrogena's $1.4 million PV system installed at company headquarters in 2001 was largely paid for by the Los Angeles Department of Water and Power. Through their solar rebate program commercial, industrial and residential customers can receive payments of $6 per watt up to a maximum of $1 million. Nanayakkara stresses the importance of designing a system that accommodates a company's energy requirements and budget. Neutrogena's goal was to save peak daytime demand when electricity is more expensive. With its 200 kW system, approximately 20 percent of the company's power needs are met, which eliminates 513,000 pounds of carbon dioxide annually.

Renewable energy technologies are viable for large and small facilities alike. The 4,000-square-foot office building of S.N. Peck Builder Inc. and Case Handyman Services in Chicago was topped with a 3.6 kilowatt PV system in April 2002 that is expected to meet 20 to 25 percent of the building's energy requirements. S.N. Peck's owner, Neil Peck, says they are committed to being a leading general contractor for green construction. Through the state of Illinois grant program, 60 percent of the system's cost was covered.

Fuel Cell Systems

While solar is the most recognized renewable option, many companies are leaning towards the reliability and efficiency of fuel cells. After a power outage disrupted operations at one of the nation's largest credit card processors, First National Bank of Omaha installed a fuel cell system to prevent a future "grid glitch." The system serves as the primary power source for the bank's 200,000 square-foot technology center. Heat from the bank's fuel cell installation provides energy for space heating, increasing the overall efficiency of the bank's system to more than 80 percent during wintertime operations. "With millions of dollars in transactions relying on the technology center every day, the bank will only settle for the highest quality of electricity for its computer operations," says Dennis Hughes, director of property management for First National Bank Building, Inc.

Peter Dalpe, spokesman for UTC Fuel Cells, a manufacturer of the technology, explains that a fuel cell uses an electrochemical process to combine hydrogen and oxygen to product electricity directly, with water and heat as by-products. Hydrogen-rich natural gas is most frequently used as the primary fuel and because there is no combustion, fuel cells are virtually pollution free.

With costs currently about $4,500 a kilowatt, fuel cells are a bit expensive. But with emerging developments in technology, they hope to get the cost down to $1,500 a kilowatt in the future, according to Dalpe. As fuel cell technology improves, it could very well replace the combustion engine in transportation, and demand is expected to increase dramatically over the next few years.

Wind Power

Although a more limited application for on-site commercial energy generation, wind power is an inexhaustible alternative to fossil fuels. Windy, rural areas are ideal

sites, and the wind turbine at Schafer Systems Inc., visible from Interstate 80 in Adair, Iowa, is a three-dimensional billboard for wind energy. “We had an interest in producing clean energy, and we have a good site for wind power,” says Phil Littler, vice president of operations at Schafer Systems, which manufactures plastic lottery ticket dispensers and point-of-purchase displays. Installed in 1995, the 225 kW turbine generates 40 percent of the facility’s energy needs. Most of the dramatic growth in the wind industry, however, is in giant wind turbines located at wind farms. According to Tom Gray, director of communications for the American Wind Energy Association, many commercial facilities are taking advantage of green power options through their utility, which includes wind as a source, but on-site wind applications are still emerging.

The potential for the commercial sector to harness energy from renewable sources is vast and the future is bright. The U.S. Department of Energy recently announced the Wind Powering America initiative with goals to power at least 5 percent of the nation's electricity with wind by 2020 and increase federal use of wind energy to 5 percent by 2010. Less dependence on fossil fuels is not only important from an environmental and efficiency perspective but also from the standpoint of safety and security. In California, if every available commercial and industrial roof was covered with PV panels the sun could generate all of the state's daytime electricity. By harnessing the power of the sun and wind, businesses are becoming a driving force for making these technologies commercially viable.

For a complete list of rebates by state, visit www.ies.ncsu.edu/dsire

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Harness the Power All Around Us

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